

In the Claims

This listing of claims will replace all prior versions and listings of claims in the application:

1 1. (Currently Amended) A method of time scale modification
2 of a digital audio signal comprising the steps of:
3 reading digital audio data from a data storage media;
4 employing a digital signal processor to
5 ~~analyzing an input signal~~ analyze the digital audio data
6 in a set of first equally spaced, overlapping time windows
7 having a first overlap amount S_a ;
8 ~~selecting~~ select a base overlap S_s for output synthesis
9 corresponding to a desired time scale modification;
10 ~~calculating~~ calculate a cross-correlation $R[k]$ for index
11 value k between overlapping frames for a range of overlaps
12 between $S_s + k_{\min}$ to $S_s + k_{\max}$ for only a fixed length overlap
13 region less than an entire overlapping region;
14 ~~selecting~~ select a value K yielding the greatest
15 cross-correlation value $R[k]$;
16 ~~synthesizing~~ synthesize an output signal in a set of
17 second equally spaced, overlapping time windows having a
18 second overlap amount equal to $S_s + K$; and
19 producing an output corresponding to the output signal
20 synthesized by the digital signal processor having the desired time
21 scale modification relative to the digital audio data read from the
22 storage media.

1 2. (Currently Amended) A method of time scale modification
2 of a digital audio signal comprising the steps of:
3 reading digital audio data from a data storage media;
4 employing a digital signal processor to

~~analyzing an input signal~~ analyze the digital audio data
in a set of first equally spaced, overlapping time windows
having a first overlap amount S_a ;

~~selecting~~ select a base overlap S_s for output synthesis
corresponding to a desired time scale modification;

~~calculating~~ calculate the cross-correlation $R[k]$ for
index value k between overlapping frames for a range of
overlaps between $S_s + k_{\min}$ to $S_s + k_{\max}$ for only a fixed length
overlap region less than an entire overlapping region
employing the equation

$$R[k] = \sum_{i=\text{initial}_x}^{\text{final}_x} \text{sign}\{y[mS_s + i + k]\} \cdot \text{sign}\{x[mS_a + i]\}$$

where: $x[i]$ is the analysis of the input signal for index
value i ; $y[i]$ is a synthesis signal for the index value i ;

~~selecting~~ select a value K yielding the greatest
cross-correlation value $R[k]$;

~~synthesizing~~ synthesize an output signal in a set of
second equally spaced, overlapping time windows having a
second overlap amount equal to $S_s + K$; and

producing an output corresponding to the output signal
synthesized by the digital signal processor having the desired time
scale modification relative to the digital audio data read from the
storage media.

3. (Original) The method of claim 1, wherein:
said step of calculating the cross-correlation $R[k]$ employs
only a center half of the overlap region for $k = 0$.

4. (Previously Presented) A digital audio apparatus
comprising:
a source of a digital audio signal;

4 a digital signal processor connected to said source of a
5 digital audio signal programmed to perform time scale modification
6 on the digital audio signal by
7 analyzing an input signal in a set of first equally
8 spaced, overlapping time windows having a first overlap
9 amount,
10 selecting a base overlap S_s for output synthesis
11 corresponding to a desired time scale modification,
12 calculating a cross-correlation $R[k]$ for index value k
13 between overlapping frames for a range of overlaps between
14 $S_s + k_{\min}$ to $S_s + k_{\max}$ for only a fixed length overlap region
15 less than an entire overlapping region;
16 selecting a value K yielding the greatest
17 cross-correlation value $R[k]$,
18 synthesizing an output signal in a set of second equally
19 spaced, overlapping time windows having a second overlap
20 amount equal to $S_s + K$; and
21 an output device connected to the digital signal processor for
22 outputting the time scale modified digital audio signal.

1 5. (Previously Presented) A digital audio apparatus
2 comprising:
3 a source of a digital audio signal;
4 a digital signal processor connected to said source of a
5 digital audio signal programmed to perform time scale modification
6 on the digital audio signal by
7 analyzing an input signal in a set of first equally
8 spaced, overlapping time windows having a first overlap
9 amount,
10 selecting a base overlap S_s for output synthesis
11 corresponding to a desired time scale modification,
12 calculating a cross-correlation $R[k]$ for index value k
13 between overlapping frames for a range of overlaps between

14 $S_s + k_{\min}$ to $S_s + k_{\max}$ for only a fixed length overlap region
15 less than an entire overlapping region employing the equation

16
$$R[k] = \sum_{i=\text{initial}_x}^{\text{final}_x} \text{sign}\{y[mS_s + i + k]\} \cdot \text{sign}\{x[mS_a + i]\}$$

17 where: $x[i]$ is the analysis of the input signal for index
18 value i ; $y[i]$ is a synthesis signal for the index value i ,
19 selecting a value K yielding the greatest
20 cross-correlation value $R[k]$,
21 synthesizing an output signal in a set of second equally
22 spaced, overlapping time windows having a second overlap
23 amount equal to $S_s + K$; and
24 an output device connected to the digital signal processor for
25 outputting the time scale modified digital audio signal.

1 6. (Original) The digital audio apparatus of claim 4,
2 wherein:
3 said digital signal processor is programmed to calculate the
4 cross-correlation $R[k]$ employing only a center half of the overlap
5 region for $k = 0$.